ments on the plates were not exactly radial, which he took to mean that they were not due to gravity, but to some irregular refracting medium. He further said that Einstein himself regarded the shift of the solar spectral lines as vital to his theory.

Prof. Lindemann and Dr. Jeffreys agreed in thinking that the experiments were by no means decisive against the existence of the spectral shift. The latter further stated that a medium capable of producing the observed shift of the stars by refraction would reflect a great deal of sunlight, whereas the plates showed no trace of such matter near κ Tauri.

FLOTATION PRINCIPLES OF ORE EXTRACTION.

AT the meeting of the Institution of Mining and Metallurgy, held on November 20, a paper entitled "A Contribution to the Study of Flotation" was presented by Mr. H. Livingstone Sulman. After giving a brief historical review of the development of flotation as applied to ore extraction, with the problems that arose in connection with successive phases of the process, Mr. Sulman dealt principally with froth flotation, which he characterised as the final link in a long chain of effort. The essentials of this process are that an aqueous pulp shall be agitated with certain reagents which may be classified as a "froth-producing" material, a "froth-stabilising" substance, and a "gangue-modifying" addition.

The explanation of flotation may be based on the differences shown by various substances in the degree to which they are "wetted" by water and other liquids. "Wetting" is a condition of wide variability, and a theory of flotation must be based largely upon the physics of wetting. The degree of wetting may be influenced by the molecular porosity of the solid surface, and indicated more or less quantitatively by the "contact angle" made between the free surface of the liquid and that of its interface with the solid.

Reviewing the various problems encountered in dealing with flotation, Mr. Sulman devoted considerable attention to the molecular constitution of liquids and solids, gravitation and molecular forces, surface energy and surface tension, interfacial tension which involves consideration of the effects of complete wetting and differential wetting, hysteresis, adsorption, the *rôle* played by immiscible oil, and the action of modifying agents such as acids. In this last connection the theories of flocculation and deflocculation have to be taken into account, including their electrical relationship. Film flotation and differential flotation receive separate attention.

The general summary of the paper gives prominence to the following findings:—Flotation reactions result from the molecular forces acting at the surfaces of solids and liquids; these arise from unbalanced molecular attractions in the surface layers, which in turn are in functional relation to the balanced molecular attractions constituting cohesion for a solid or a liquid. Every solid or liquid, therefore, possesses excess energy at its surface, which may be exhibited in adhesion effects. Liquid-solid adhesion is broadly reciprocal to interfacial tension. The degree of wetting can be relatively quantified within certain limits by the contact angle made between the free surface of the liquid and that of the solid. Contact angles have a minimum and a maximum value; the angular difference between these values is the hysteresis of the contact angle, which permits a wider range of equilibrium for a floating particle.

The dynamical aspect of the subject is concerned with the molecular constitution of the interfaces, with the kinetic effects of molecular motion at the surfaces and interfaces of solids and liquids, and with those in the interior of liquids. Solid surfaces are probably penetrable by the molecules of liquids, which enhances the adhesions between them; such penetrations may give rise to a persistent tendency for the solid to be again wetted by the same liquid. Concentration of foreign molecules at the surface of a pure or homogeneous liquid (positive adsorption) reduces the surface tension of the liquid and confers upon it the property of "frothing."

Frothing reagents useful in flotation produce a froth with water, yet leave a partial strain (mineral-adsorptive energy) at the bubble surface. The mineral adsorption now stabilises the film, especially if the mineral be minutely oil-filmed; still more so if flocculated. To be employed effectively the bubble system must be disseminated throughout the mass of ore-pulp. When water-strain is completely removed from the surface of suspended particles, deflocculation results. Flocculation is greatly increased by mechanical agitation, by minutely oiling the particles, and by contact with air; these are factors necessary to produce standard mineralised froths. Generally, if a substance can be flocculated it can be floated. Electrical phenomena are concomitants of minor order. Flotation depends on bringing about the most advantageous selective adhesions, selective adsorptions, and selective flocculations between the complex of particles in an ore-pulp.

THE BRITISH ASSOCIATION AT BOURNEMOUTH.

SECTION L.

EDUCATIONAL SCIENCE.

OPENING ADDRESS (ABRIDGED) BY SIR NAPIER SHAW, LL.D., SC.D., F.R.S., PRESIDENT OF THE SECTION.

Educational Ideals and the Ancient Universities.

A PRESIDENTIAL address before the Educational Section of the British Association is an undertaking that might fairly daunt the bravest of those who are really acquainted with its difficulties. The vast range and variety of the problems of education; the enormous amount of effort that is already expended upon them; the torrents of advice and criticism that are offered by those who are familiar with the details of the various curricula, who know how things ought to be done—if I had had time and capacity to become acquainted with all these things, I suppose I must have avoided the duty of making an address. It is, perhaps, the detachment of my present position from any responsibility for details which gives me the courage to recall experiences, now twenty years old, acquired during a lengthy service in various capacities at Cambridge, and matured by twenty years of the consciousness of the dire need of educational discipline and training for those whose business it is to use science in the service of the State.

With a certain amount of assurance I can even be glad that I am not in touch with the educational controversies of the hour, and confidently trust that my deficiencies will be made good by the contributions of those who know to the discussions which will take place in the Section, but the difficulty that I cannot get over just now is that, from the unavoidable circumstances of the present time, a presidential address is a "back number" before it is delivered, for the simple reason that, according to tradition, it must be printed in advance. In this particular year there is an almost immeasurable gulf of experience between the time of my appointment in 1917 and the delivery of this address; the president himself is in many ways a different person from him who undertook the duty of addressing you two years and a half ago.

At that time I had been a good deal moved by the wearying controversy about the relative merits of classics and science in education, because the physical sciences as taught were such a doleful misrepresentation of the spirit of inquiry about the universe which has moved men in all ages and is as clamant to-day as ever. The mysteries of the firmament, the midnight sky, the storm and calm, the earthquake and the thunder, the sunshine, the rainbow and the halo, the intolerable heat and the pitiless cold, the mariner's compass, the aurora and the mirage, are still as wonderful as ever to the wayfarer and the seafarer, and even the dweller in towns wants to know more about them. Yet our educational system, as I knew it, passed all these subjects by and offered instead the determination of the specific heat of copper, with other things that the specific heat of copper stands for. The same, I believe, is true for many of the most interesting subjects of scholarship in ancient and modern civilisations, learning, and languages. And if an inquirer, young or old, should ask whether, if he went there, the great universities could tell him all about the things of wonder or of beauty that he is conscious of, or about the reminiscences of past generations that he finds around him as he travels through life, he could only be told that in consequence of the perverse malignity of external circumstances they had no money to devote to his enlightenment. The capacity would be there in abundance, but not the means. In three years they would put him in a position to pursue intelligently for himself if he pleased any of the subjects in which his interest had been excited, but the facilities for education would extend only to the point where his interest began.

So I wrote a little pamphlet on "The Lack of Science in Education, with Some Hints of What Might Be," and when I was invited to occupy this chair I thought I might be of some service to education if I pressed the subject further and endeavoured to show how, in spite of the good will of nearly everybody concerned, the peculiar constitution of our chief universities was really standing in the way of the lofty ideal of higher education which must find expression if the education which we all want is really to come to pass in this country.

Circumstances have already vastly changed. Committees have sat upon the teaching of science and the teaching of modern languages. A great Education Act has been passed, and the poverty of the universities has overstepped the limits of starvation and a Commission of Inquiry is promised. So we are now on the high road to making presidential addresses matters of quite subordinate interest. Still, you may be interested to hear what I wrote two years and a half ago in explanation of the peculiar difficulties of our educational system; so here it is. It makes a good deal of play of a certain scene in "The Merchant of Venice," which I shall beg you to regard, for a few minutes only, as a satire upon the state of the universities in the spacious times of Queen Elizabeth, after a period of magnificent activity on the part of founders and benefactors and after a succession of statutes for the universities made by successive monarchs for the governance of those institutions, which were then recognised as of the highest importance in the State. Such a period of reconstruction seems to have come again in our time, and the satire, if it be one, is as true to-day as it was three centuries ago.

I was arrested by the curious sentiment, "If to do were as easy as to know what were good to do, chapels had been churches and poor men's cottages princes' palaces." I wondered whether Portia was in fact intended to personify a liberal education. For other subjects of human activity her statement is palpably absurd. All the experience of the British race indicates to us that the acute divisions between people arise in discussions as to what were good to do; the actual doing is easy if the preliminary question "what were good to do" is really decided. Can anyone doubt that after our experience of the war?

But if it were education that Shakespeare was thinking about, chapels and churches, poor men's cottages and princes' palaces are not inappropriate in that connection; the sentiment stimulates the imagination. Certainly in education to know what were good to do does seem in practice to be infinitely easier than to do. From time to time the newspapers are full of reports of conferences, meetings, congresses, and assemblies all fully assured that they know what were good to do, yet very little happens. Our scheme of education is still unsatisfying. Why?

That is the question which I propose for your consideration. Why is it that all the pious opinions about education come to nothing or to so little?

First of all it must be noted that the resolutions and proposals are not addressed to anybody in particular. Presumably they are intended to form public opinion, but public opinion has no authoritative voice with those who are in charge of the higher educational institutions. The resolutions are sent out like wireless signals from a ship at sea. Any educational institution with a receiver tuned to the proper wave-length can take them in, but if the receiver is not tuned or the operator is inattentive, nothing happens. There is no corporate responsibility for the aggregate of our higher educational institutions.

We may, I think, agree that if we wish for ideals in education in this country we must find them in the universities. If the universities give the encouragement of their example and then licence to teach only to men and women who are really educated in the best sense of the word, their influence will leaven the whole of education throughout the country; and, on the contrary, if when they leave the universities the men and women who have to teach, or to control teachers, are themselves imperfectly educated, it is hopeless to expect a well-balanced, living educational system. Among the universities, for reasons good or ill, into which I need not enter, the older Universities of Cambridge and Oxford have a preponderant influence.

And, to my mind, the outstanding characteristic of the organisation of the older universities is the lack of any recognised door by which their corporate responsibility can be reached. In each case the university is itself a corporate educational institution which includes some twenty colleges, which are also separate corporate educational institutions. You never can tell whether the persons with whom you have business are the university or the colleges, and it is quite possible that when you think to address the one you find yourself confronted with the other. The universities in their corporate capacity are constrained by statutes and traditions handed down by our forefathers to look on in comparative impotence while their ideals are distorted or concealed by the interplay of the interests of the many corporations of which they are composed. The whole complex scheme of management forms a sort of craft or mystery which very few even of the initiated really comprehend.

In January of 1917 the Headmasters' Conference (which consists of men with some academic experience) passed a resolution to the effect that Greek should no longer be required for the entrance examination of the Universities of Oxford and Cambridge, and thereupon the Master of University College, Oxford, spent half a column of the *Times* in explaining that the University of Oxford had no entrance examination at all.

This veil of mystery about matters of national concern is very perplexing for those who want things done in education, but do not know the technicalities of the universities. What is true, for Cambridge at least, is that the university *qua* university has no examination for entrance; it is obliged by its statutes to accept as a member without any question anyone presented by the recognised authority of a college, regardless altogether of his qualification or disqualification for a university career. It is a very remarkable arrangement. The university makes no inquiry as to a student's fitness to profit by its educational system; it leaves all that to the colleges, and many, if not all, of the colleges have an entrance examination. So I offer this paradox for the logician who is interested in higher education.

The university consists of the members of its constituent colleges and a few others. At the discretion of the several colleges, or the non-collegiate students' board, 75 per cent. of the members of the university are required to pass an entrance examination before they are accepted for presentation to the university for matriculation. There are at least four examinations of the university which are accepted by colleges on occasions in lieu of their own entrance examinations. Yet there is no entrance examination for the university.

And this does not end the matter. With the power of selecting its students vested in twenty different bodies, the university becomes a controlling body rather than an educational institution with a definite purpose and programme. The regulations for its students are nearly all of them of a negative character. The discipline and the regimen of the university rest upon the assumption that a student desires to secure from the university not so much attainment as a stamp for his attainments. A member of the university cannot be admitted to a degree unless he has satisfied certain conditions of residence, and also satisfies certain examiners; his name is not accepted for the final examination unless he has satisfied certain other examiners. There is nothing in the regulations or administration of the university to secure that a matriculated student shall study or aspire to take a degree. He might live on in idleness and ignorance for the rest of his natural life; the university has no choice in the matter so long as his college pays the periodical fees. It trusts to the colleges to see that idle or unsuitable undergraduates are invited to go elsewhere.

Here we have one of the many instances of the division of jurisdiction between the colleges and the university which hides the ideals of our system of higher education in an impenetrable fog.

The university is governed by the colleges according to a system which goes back to the time when "The Merchant of Venice" was written, so let us revert to the conversation between Portia and Nerissa which expounds the lottery of the caskets in the well-known scene. The position of the university in the matter of the selection or rejection of its members is exactly that which Portia bewailed to Nerissa. Let me invite you to regard the episode of the caskets as a figurative representation of the lottery by which the University of Cambridge selects those upon whom she bestows her inherited riches—*lucem et pocula sacra.* Cambridge, like Portia, the heiress of all the learning of the good and the great, bound by the fantasy of her ancestral tradition never to choose for herself.

Let us think of Portia as the Vice-Chancellor of the University of Cambridge, desiring above all things the advancement of learning, and of Nerissa as a proctor, whose duty it is, as representing the Senate, the collective body of members of the colleges, to see that the statutes and ordinances are duly attended to. Listen to the conversation:—

"*Portia* [*V.-C.*]: O me, the word 'choose'! I may neither choose whom I would nor refuse whom I dislike; so is the will of a living daughter curbed by the will of a dead father. Is it not hard, Nerissa, that I cannot choose one nor refuse none?

"*Nerissa* [*Proctor*]: Your father was ever virtuous; and holy men at their death have good inspirations; therefore the lottery that he hath devised in these three chests of gold, silver, and lead, whereof who chooses his meaning chooses you, will, no doubt, never be chosen by any rightly but one who shall rightly love. . . .

"*Portia* [*V.-C.*]: If I live to be as old as Sibylla, I will die as chaste as Diana, unless I be obtained by the manner of my father's will."

I need scarcely say that I should not spend so much time over what may seem to many of you far-fetched, and perhaps unseemly jesting, if I did not believe that this fantastic view of the lottery of the caskets contains the suggestion of an element in the governance of our highest educational institutions which deserves your gravest and most serious consideration. What I have in mind at the moment is the unforeseen and undesired result of the competition of the colleges within the university itself as quasi-independent educational institutions. It is this small matter, from some points of view of quite minor importance, which, so far as I can see, prevents our great universities from taking the leading part which they might take in exemplifying the ideals of a co-ordinated national system of education, and makes the success or failure of those great institutions something of the nature of a lottery. They may offer ten thousand different avenues from matriculation to a degree, and yet the student may find himself imperfectly educated in the end.

One may, indeed one must, picture to oneself the idea of the colleges as a number of educational institutions co-operating in an avowed and transparent common purpose of the university to display the highest educational ideals. So I think, if they were willing, they might be, without any sacrifice of their individuality or of those magnificent traditions which have fulfilled the high purpose of their pious founders and benefactors. Let us keep that picture for a while in mind.

I have taken from the Cambridge University Calendar for 1918 a list of subjects selected for teaching in the university and colleges, with the number of professors, readers, lecturers, or teachers assigned to the several subjects.

I find that there are 175 university teachers (professors, readers, lecturers, etc.) and 176 college lecturers. I find that the 175 university teachers between them deal with 73 subjects, an average of 2⅓ per subject, and are distributed between subjects in the following manner:—

Number of university teachers assigned for a subject

9 8 7 6 5 4 3 2 1

Number of subjects which have the number of teachers specified in the upper line

2 3 1 4 1 3 8 10 42

The 176 college lecturers deal with only 23 subjects, an average of 7½ per subject. They are distributed as follows:—

Number of college lecturers assigned for a subject	33	30	23	18	17	10	5	3	2	1	?
Number of subjects that have the number of teachers specified in the upper line	1	1	1	1	1	1	3	1	3	9	6

Here we see at once a great difference between the educational systems. The university is obviously striving to meet so far as possible its higher educational responsibilities. There is great differentiation of duty; 42 teachers are responsible each for a single subject; there are only two cases in which a subject has so many as nine teachers, whereas in the colleges the tendency is for the same subject to have a great number of exponents. The favoured subjects are:—Classics 33, mathematics and natural philosophy 30, history and economics 23, natural sciences 18, and divinity 17. All those subjects are also provided for, to some extent at least, in the programme of the university. There may be, and indeed must be, some differentiation within these totals, but it is a differentiation which the college authorities do not think it necessary to disclose. Whatever allowance may be made for that, I think it is obvious that the colleges tend to repeat many times over a stereotyped form, and not to distribute their energies over subjects which, for lack of funds or some other reason, are not represented in the university list. Three subjects appear in the college list and not in the university list, namely, modern Greek, Celtic, and military history. We may be sure that the 176 college lecturers are in themselves fully competent to represent subjects of profound human interest which the university disregards for want of means. That it is the system and not the lecturers that account for this convergence upon a few subjects was evident enough during the war, when Cambridge lecturers were to be found among the most proficient and successful workers with their brains in many departments of activity. The needs of peace are not less urgent than the needs of war.

No one can think that the distribution of teachers and subjects would be what it is if the educational system of the university and the colleges were under the control of a single competent body bent upon manifesting a true ideal of the use of educational endowments, whether in money or men.

Suppose, for example, that the council of the Senate were recognised as responsible to the country for the educational system of the university and the colleges jointly; that, once appointed, they were freed from the referendum of every item of their procedure to the lottery of a vote in the Senate. Imagine what would happen if the university really had an entrance examination and the colleges had to select their members from among the successful candidates. One may speculate upon what such a body would produce, but it is scarcely imaginable that they would plump for concentrating so much of the college teaching in general terms upon classics, mathematics, history, and divinity.

And, in support of the contention that diversity of intellectual effort is a pertinent consideration, I would point out that if recondite subjects are to be studied at all it must be at our own great centres of learning. If there is any part of the world where old customs are dying out, or interesting species becoming rare or extinct, it is for highly centralised countries like ours, at a distance from the scene of action, to take care that the subject is studied while there is yet time. On the spot, where no doubt the material is more readily available, people are too much preoccupied to notice the ultimate effect of their own personal activity. If we should, for example, set about exterminating the vermin of London houses (which, by the way, is above all things a most urgent question of rehousing), it is not from any Londoner, or even from our near neighbours in Cambridge, however interesting the minor horrors of war may be to their biologists, that any protest will be raised about the outrage which the extermination would entail upon the province of natural history.

I have looked through that interesting volume "The Yearbook of the Universities of the Empire, 1914," to see whether the older universities of this country and the Empire had a notably extended or different range of subjects. The differences are mostly in name or in the differentiation of medical and theological subjects. It is interesting to note the gradual formation of university teaching in new lands. It seems to begin with medicine and theology, law, engineering, architecture, commerce, and banking; and next to take in our old college friends mathematics, classics, and natural sciences, but it seldom shows any particular characteristics of local scholarship or specialised learning; in the older institutions there are some suggestive subjects, as Assyrian and Babylonian archæology, classical archæology, African languages (Swahili and Bantu), Irish language and literature, Dutch language and literature, Japanese, Portuguese, Scandinavian languages and Thibetan, phonetics, library science, ancient Indian history and culture, Colonial history, Irish history, Scots history, civic design and civic law, scholastic philosophy, Zend philosophy, rhetoric and oratory, geodesics, acoustics, meteorology, and epidemiology in various forms.

Among the subjects which I have noticed in other connections as not represented by name in any of the universities of the Empire, but still claiming attention from those who would help to make the facilities for education complete, there are, in the first place, the history of the various arts and sciences and of medicine, for which some provision has recently been made at Oxford under Dr. Singer; oceanography, which, through the generosity of Prof. Herdman, has now obtained a footing in Liverpool; geodynamics, for which Cambridge wishes to make provision, historical geography and exploration; Malay and Polynesian languages and antiquities, aerodynamics, meteorological optics, now neglected in this country; terrestrial magnetism, seismology, climatology (past and present), particularly of the Empire; illumination and photography, metrology, the science of precision, British archæology and dialects; and perhaps the technical subjects of radio-telegraphy, ballistics, and ventilation. These are subjects with which alone a fully equipped university is competent adequately to deal, and the country is ill-provided until the educational authorities co-operate to supply between them what is needed. To secure this object I am not at all convinced that State aid is the only possibility. The pious benefactor is no more extinct than he was in the days of Henry VIII. and Queen Elizabeth, but while the universities and their colleges speak with two voices and leave us uncertain as to their ideals, it is impossible that he should not be discouraged.

As one passes in review our own educational institutions, one may judge of their ideals by their results. Judging in that way, and looking at the education of our public schools, we may fairly say that the social or ethical ideal is splendid. It expresses the principle of excellence which I take to mean success in fair competition. It is no doubt Hellenic rather than Christian; it is based upon the literature of the ancient Greeks, and has still strength enough to call forth the most devoted self-sacrifice. In the universities also the same ideal is quite easily recognised. There, if anywhere, you can see the worship of success in fair competition developed into a real religion. For a long time I have thought that we should be much nearer understanding our real position in these things if we could persuade the classical scholars to do for Greek religion what the compilers and translators of the Bible did for the Hebrew—that is, to collect together in the best available translation the literature of the Greeks which formed the basis of their guides to conduct. The appropriate contents of such a collection were sketched out by Dr. James Adam, a college colleague of mine at Cambridge, whose untimely death is still deplored, in his Gifford lectures on the religion of the Greeks. With him the subject was a source of unbounded enthusiasm, and his lectures are a series of sermons on the Testament of the Greeks. But we ordinary readers, unlearned in the Greek literature, are in the position of those who are offered sermons on the Old Testament instead of the Old Testament itself. If you imagine where we should stand if the Old Testament were denied to us except in the original Hebrew, you will understand the position the vast majority of us must occupy with regard to Greek ethics, which are, in fact, the ethics of our ruling classes in the old sense. Therefore I use this opportunity to beg those who are enthusiastic for Hellenistic studies to give us such a Testament. I feel sure it will enable us to understand the ideals of the public schools and universities, and throw an entirely new light upon the supposed conflict of classical and scientific studies, which is possibly only another phase of the other perennial dispute about religious education.

The ethical ideals of our schools and universities are clear, excellent in themselves, and appreciated everywhere. They manifestly excite enthusiasm and develop the spirit of self-sacrifice for their maintenance. But what of the intellectual ideals? The subject is important, because the cultivation of the intellect is the avowed purpose of academic institutions, and the part of education which is necessary for carrying on the world's work. Looking at the actual practice of the universities, we can see that the intellectual ideals are obscured, confused, and enfeebled by the very process of competition between colleges which is so eminently successful in developing the ethical spirit.

But the opportunity for strengthening and clearing our intellectual ideals is now. It may require some sacrifice of prejudices and traditions as between colleges and the university, but the reward will certainly be great.

I suppose that the character of any distinguished educationist a century ago would be summed up in the words, "He spared not the rod"; and to-day perhaps the highest praise is expressed by saying that "He spared neither the ratepayer nor the taxpayer," but even that is not enough. Money without motive power does not make education. We may reserve our highest praise for those educational establishments of which it may be said that in the pursuit of a true ideal they spared "neither their prejudices nor their inherited privileges." It may sound sacrilegious, but it must be said: the Portia of our dreams will not become the *alma mater* that the nation needs if she can never be obtained except after the manner of her father's will.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

SHEFFIELD.—Prof. C. H. Desch has been appointed professor of metallurgy in succession to Prof. J. O. Arnold. Since September, 1918, Prof. Desch has been professor of metallurgy in the Royal Technical College, Glasgow, and he was previously Graham Young lecturer in metallurgical chemistry in the University of Glasgow.

VISCOUNT HALDANE, as president of Birkbeck College, was in the chair at the founder's day celebration on December 12. Fifty-eight of the graduates of the college who have taken their degrees at the University of London since 1914, totalling 138, were presented to the president. The Principal (Dr. George Senter), in his report, said that 600 Birkbeck men were known to have been on active service. Of these 331 obtained commissions, and 87 names were on the roll of honour. During the war the chemistry department of the college provided certain drugs needed for war purposes, and the physics department tested more than two thousand optical instruments. Four-fifths of the students in normal times were evening students. Lord Haldane gave an address on "What is Truth?" He said this was a topic on which he had been reflecting for forty-five years—ever since he first entered a university. This question was bound up with another, the same thing in another form, the relativity of knowledge, of which we had heard a great deal just lately. Einstein had told them about it, but he had dealt only with a fragment of the problem of relativity, which covered the whole field of knowledge. The problem of relativity went far beyond the mathematics of astronomy. What was it that Einstein had been trying to tell the world? Even when you could put truth into a nutshell, it was not always possible to keep it there. The problem which Einstein had raised was not new. People had thought of time and space as something they knew all about, of a straight line as the shortest distance between two points. He then explained that to answer the question "What is Truth?" we must realise that the principle of relativity had shown us that the reality and our conception of it are not wholly separate. The observer and the observed could not be separated, and account must be taken of the observer. Sir Frederic Kenyon moved a vote of thanks, which was seconded by Mr. James C. N. White.

THE Manchester Municipal College of Technology is making an appeal to the industrial and commercial community of Manchester and of south-east Lancashire for the sum of 150,000*l*., with a view to the extension of the present building and equipment on land adjoining the college bought some years ago for that purpose at a cost of 44,000*l*. The present teaching resources of the college are taxed to overflowing with full-time day students, who now exceed five hundred, the majority of whom are proceeding to degrees in the faculty of technology in the University, whilst others are engaged in whole-time post-graduate scientific industrial research. There is every prospect that this number will be considerably augmented in the near future, and the governing body is desirous of making the fullest preparation for the increase, having regard to the serious competition of the chief foreign nations, notably America, Germany, Switzerland, and Japan, in the overseas markets. The urgent need for this extension has been commended by several important firms representative of the chief industries of the area, notably those engaged in the chemical, engineering, and textile trades; and at a recent meeting of the local branch of the Federation of British Industries held in the city the following resolution was unanimously passed:—"That, having regard to the fact that the Manchester College of Technology was the first technical institution of university rank to be established in this country, and being firmly of opinion that the development of the invaluable work of the College of Techno-